Z77 Extreme11

User Manual

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(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

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The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see
www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock Website: http://www.asrock.com

Contents

1. Introduction 5

1.1 Package Contents 5
1.2 Specifications 6
1.3 Unique Features 11
1.4 Motherboard Layout 16
1.5 I/O Panel 18

2. Installation 20

2.1 Installing the CPU 21
2.2 Installing the CPU Fan and Heatsink 23
2.3 Installing Memory Modules (DIMM) 24
2.4 Expansion Slots (PCI Express Slots) 25
2.5 Installing Serial SATA / SATA2 / SATA3 Hard Disks 27
2.6 Power Connectors 29
2.7 Installing the System Panel 30
2.8 Onboard Headers and Connectors 31
2.9 Jumpers Setup 35
2.10 WiFi + BT Module and ASRock Wi-SB Box 36
2.11 Operating System Setup 40
2.11.1 Installing Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit Without RAID 40
2.11.2 Installing Windows® 8 64-bit / 7 64-bit / Vista™ 64-bit on a HDD Larger than 2 terabytes 41
2.11.3 Installing Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit with RAID 42
2.12 Installing Drivers 43
2.13 Smart Switches 44
2.14 Dr. Debug 45
2.15 SLI™, 3-Way SLI™ and Quad SLI™ Operation Guide ... 47
2.16 CrossFireX™, 3-Way CrossFireX™, 4-Way CrossFireX™ and Quad CrossFireX™ Operation Guide 52
2.17 Surround Display 57
2.18 Hot Plug and Hot Swap for Hard Disk Drives 58
2.19 Dual LAN and Teaming Operation Guide 62

3. UEFI SETUP UTILITY..... 63
3.1 Introduction 63
3.1.1 UEFI Menu Bar 63
3.1.2 Navigation Keys 64
3.2 Main Screen 65
3.3 OC Tweaker Screen 66
3.4 Advanced Screen 73
3.4.1 CPU Configuration 74
3.4.2 North Bridge Configuration 76
3.4.3 South Bridge Configuration 77
3.4.4 Storage Configuration 79
3.4.5 Intel(R) Rapid Start Technology 80
3.4.6 Intel(R) Smart Connect Technology 81
3.4.7 Super IO Configuration 82
3.4.8 ACPI Configuration 83
3.4.8 USB Configuration 85
3.5 Tool 86
3.6 Hardware Health Event Monitoring Screen 88
3.7 Boot Screen 90
3.8 Security Screen 92
3.9 Exit Screen 93

1. Introduction

Thank you for purchasing ASRock ***Z77 Extreme11*** motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

In this manual, chapter 1 and 2 contains the introduction of the motherboard and step-by-step hardware installation guide. Chapter 3 and 4 contains the configuration guide of BIOS setup and information of the Support CD.

Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock's website without further notice. You may find the latest VGA cards and CPU support list on ASRock's website as well. ASRock website http://www.asrock.com

If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.

www.asrock.com/support/index.asp

1.1 Package Contents

ASRock ***Z77 Extreme11*** Motherboard
(EATX Form Factor: 12.0-in x 10.5-in, 30.5 cm x 26.7 cm)
ASRock ***Z77 Extreme11*** Quick Installation Guide
ASRock ***Z77 Extreme11*** Support CD
8 x Serial ATA (SATA) Data Cables
2 x Serial ATA (SATA) HDD Power Cables
1 x I/O Panel Shield
1 x ASRock SLI_Bridge_3S Card
1 x ASRock 3-Way SLI Bridge Card
1 x ASRock Wi-SB Box
12 x Screws

1.2 Specifications

Platform	- EATX Form Factor: 12.0-in x 10.5-in, 30.5 cm x 26.7 cm - 2oz copper PCB - Premium Gold Capacitor design (100% Japan-made high-quality Conductive Polymer Capacitors)
CPU	- Supports 3rd and 2nd Generation Intel® Core™ i7 / i5 / i3 in LGA1155 Package - Digi Power Design - 8 + 4 Power Phase Design - Dual-Stack MOSFET (DSM) - Supports Intel® Turbo Boost 2.0 Technology - Supports Intel® K-Series unlocked CPU - Supports Hyper-Threading Technology
Chipset	- Intel® Z77 - Supports Intel® Rapid Start Technology and Smart Connect Technology
Memory	- Dual Channel DDR3 Memory Technology - 4 x DDR3 DIMM slots - Supports DDR3 3000+(OC)/2400(OC)/2133(OC)/ 1866(OC)/1600/1333/1066 non-ECC, un-buffered memory - Max. capacity of system memory: 32GB (see **CAUTION 1**) - Supports Intel® Extreme Memory Profile (XMP)1.3/1.2
Expansion Slot	- 3 x PCI Express 3.0 x16 slots (PCIE1/PCIE5: single at x16 (PCIE1)/x8(PCIE5) or dual at x8/x8; PCIE3: x8 mode) * PCIE 3.0 is only supported with Intel® Ivy Bridge CPU. With Intel® Sandy Bridge CPU, it only supports PCIE 2.0. - 1 x PCI Express 2.0 x16 slot (PCIE7: x4 mode) - 3 x PCI Express 2.0 x1 slots - 1 x mini-PCI Express slot: For WiFi + BT module - PLX PEX 8747 and PLX PEX 8608 embedded - Supports AMD Quad CrossFireX™, 4-Way

	CrossFireX™, 3-Way CrossFireX™ and CrossFireX™ - Supports NVIDIA® Quad SLI™, 3-Way SLI™ and SLI™
Graphics	* Intel® HD Graphics Built-in Visuals and the VGA outputs can be supported only with processors which are GPU integrated. - Supports Intel® HD Graphics Built-in Visuals : Intel® Quick Sync Video 2.0, Intel® InTru™ 3D, Intel® Clear Video HD Technology, Intel® Insider™, Intel® HD Graphics 2500/4000 with Intel® Ivy Bridge CPU - Supports Intel® HD Graphics Built-in Visuals : Intel® Quick Sync Video, Intel® InTru™ 3D, Intel® Clear Video HD Technology, Intel® HD Graphics 2000/3000, Intel® Advanced Vector Extensions (AVX) with Intel® Sandy Bridge CPU - Pixel Shader 5.0, DirectX 11 with Intel® Ivy Bridge CPU. Pixel Shader 4.1, DirectX 10.1 with Intel® Sandy Bridge CPU - Max. shared memory 1760MB with Intel® Ivy Bridge CPU. Max. shared memory 1759MB with Intel® Sandy Bridge CPU - Supports HDMI 1.4a Technology with max. resolution up to 1920x1200 @ 60Hz - Supports Auto Lip Sync, Deep Color (12bpc), xvYCC and HBR (High Bit Rate Audio) with HDMI - Supports HDCP with HDMI - Supports Full HD 1080p Blu-ray (BD) / HD-DVD playback with HDMI
Audio	- 7.1 CH HD Audio with Content Protection (Realtek ALC898 Audio Codec) - Premium Blu-ray audio support - Supports THX TruStudio™
LAN	- 2 x PCIE x1 Gigabit LAN 10/100/1000 Mb/s - Intel 82579V, Intel 82583V - Supports Wake On LAN - Supports Dual LAN with Teaming function - Supports PXE

Wireless LAN	- Supports IEEE 802.11a/b/g/n - Supports Dual-Band (2.4/5 GHz) - Supports High speed wireless connection up to 300Mbps - 2 antennas to support 2 (Transmit) x 2 (Receive) MIMO technology - Supports Bluetooth 4.0 Class II
Rear Panel I/O	- 1 x PS/2 Mouse/Keyboard Port - 1 x HDMI Port - 1 x Optical SPDIF Out Port - 2 x Ready-to-Use USB 2.0 Ports - 1 x eSATA3 Connector - 8 x Ready-to-Use USB 3.0 Ports - 2 x RJ-45 LAN Ports with LED (ACT/LINK LED and SPEED LED) - 1 x IEEE 1394 Port - 1 x Clear CMOS Switch with LED - HD Audio Jacks: Rear Speaker / Central / Bass / Line in / Front Speaker / Microphone
SAS2/SATA3	- 2 x SATA3 6.0 Gb/s connectors by Intel® Z77, support RAID (RAID 0, RAID 1, RAID 5, RAID 10, Intel Rapid Storage and Intel Smart Response Technology), NCQ, AHCI and Hot Plug (SATA3_1 connector is shared with eSATA3 port) - 8 x SAS2/SATA3 6.0 Gb/s connectors by LSI SAS2308 PCIe 3.0 x8 controller, support RAID (RAID 0, RAID 1, RAID 1E and RAID 10), MegaRAID Utility, NCQ and Hot Plug
USB 3.0	- 4 x Rear USB 3.0 ports by Intel® Z77, support USB 1.1/2.0/3.0 up to 5Gb/s - 4 x Rear USB 3.0 ports by Etron EJ188, support USB 1.1/2.0/3.0 up to 5Gb/s - 2 x Front USB 3.0 headers by Etron EJ188 (support 4 USB 3.0 ports), support USB 1.1/2.0/3.0 up to 5Gb/s
Connector	- 4 x SATA2 3.0 Gb/s connectors, support RAID (RAID 0, RAID 1, RAID 5, RAID 10 Intel Rapid Storage and

	Intel Smart Response Technology), NCQ, AHCI and Hot Plug - 2 x SATA3 6.0 Gb/s connectors - 8 x SAS2/SATA3 6.0 Gb/s connectors - 1 x IR header - 1 x CIR header - 1 x COM port header - 1 x HDMI_SPDIF header - 1 x IEEE 1394 header - 1 x Power LED header - 2 x CPU Fan connectors (1 x 4-pin, 1 x 3-pin) - 3 x Chassis Fan connectors (1 x 4-pin, 2 x 3-pin) - 1 x Power Fan connector (3-pin) - 1 x SB Fan connector (3-pin) - 24 pin ATX power connector - 8 pin 12V power connector - SLI/XFire power connector - Front panel audio connector - 3 x USB 2.0 headers (support 6 USB 2.0 ports) - 1 x Vertical Type A USB - 2 x USB 3.0 headers (support 4 USB 3.0 ports) - 1 x Dr. Debug with LED - 1 x Power Switch with LED - 1 x Reset Switch with LED
BIOS Feature	- 64Mb AMI UEFI Legal BIOS with GUI support - Supports “Plug and Play” - ACPI 1.1 Compliance Wake Up Events - Supports jumperfree - SMBIOS 2.3.1 Support - CPU Core, IGPU, DRAM, 1.8V PLL, VTT, VCCSA Voltage Multi-adjustment
Support CD	- Drivers, Utilities, AntiVirus Software (Trial Version), CyberLink MediaEspresso 6.5 Trial, ASRock MAGIX Multimedia Suite - OEM, Google Chrome Browser and Toolbar
Hardware Monitor	- CPU/Chassis/SB Temperature Sensing - CPU/Chassis/Power/SB Fan Tachometer

	- CPU/Chassis Quiet Fan - CPU/Chassis Fan Multi-Speed Control - Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore
OS	- Microsoft® Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit compliant
Certifications	- FCC, CE, WHQL - ErP/EuP Ready (ErP/EuP ready power supply is required)

* For detailed product information, please visit our website: http://www.asrock.com

WARNING

Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

CAUTION!

1. Due to the operating system limitation, the actual memory size may be less than 4GB for the reservation for system usage under Windows® 8 / 7 / Vista™. For Windows® 64-bit OS with 64-bit CPU, there is no such limitation. You can use ASRock XFast RAM to utilize the memory that Windows® cannot use.

1.3 Unique Features

ASRock Extreme Tuning Utility (AXTU)

ASRock Extreme Tuning Utility (AXTU) is an all-in-one tool to ne-tune different system functions in a user friendly interface, which includes Hardware Monitor, Fan

Control, Overclocking, OC DNA, IES and XFast RAM. In Hardware Monitor, it shows the major readings of your system. In Fan Control, it shows the fan speed and temperature for you to adjust. In Overclocking, you are allowed to overclock CPU frequency for optimal system performance. In OC DNA, you can save your OC settings as a profile and share it with your friends. Your friends then can load the OC profile to their own system to get the same OC settings. In IES (Intelligent Energy Saver), the voltage regulator can reduce the number of output phases to improve efficiency when the CPU cores are idle without sacrificing computing performance. In XFast RAM, it fully utilizes the memory space that cannot be used under Windows® OS 32-bit CPU.

ASRock Instant Boot

ASRock Instant Boot allows you to turn on your PC in just a few seconds, provides a much more efficient way to save energy, time, money, and improves system running speed for your system. It leverages the S3 and S4 ACPI features which normally enable the Sleep/Standby and Hibernation modes in Windows® to shorten boot up time. By calling S3 and S4 at specific timing during the shutdown and startup process, Instant Boot allows you to enter your Windows® desktop in a few seconds.

ASRock Instant Flash

ASRock Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. With this utility, you can press the <F6> key during the POST or the <F2> key to enter into the BIOS setup menu to access ASRock Instant Flash. Just launch this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other

complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system.

ASRock APP Charger

If you desire a faster, less restricted way of charging your Apple devices, such as iPhone/iPad/iPod Touch, ASRock has prepared a wonderful solution for you - ASRock APP Charger. Simply install the APP Charger driver, it makes your iPhone charge much quickly from your computer and up to 40% faster than before. ASRock APP Charger allows you to quickly charge many Apple devices simultaneously and even supports continuous charging when your PC enters into Standby mode (S1), Suspend to RAM (S3), hibernation mode (S4) or power off (S5). With APP Charger driver installed, you can easily enjoy the marvelous charging experience.

ASRock XFast USB

ASRock XFast USB can boost USB storage device performance. The performance may depend on the properties of the device.

ASRock XFast LAN

ASRock XFast LAN provides faster internet access, which includes the benefits listed below. LAN Application Prioritization: You can configure your application's priority ideally and/or add new programs. Lower Latency in Game: After setting online game's priority higher, it can lower the latency in games. Traffic Shaping: You can watch Youtube HD videos and download simultaneously. Real-Time Analysis of Your Data: With the status window, you can easily recognize which data streams you are transferring currently.

ASRock XFast RAM

ASRock XFast RAM is a new function that is included in

ASRock Extreme Tuning Utility (AXTU). It fully utilizes the memory space that cannot be used under Windows® 32-bit OS. ASRock XFast RAM shortens the loading time of previously visited websites, making web surfing faster than ever. And it also boosts the speed of Adobe Photoshop 5 times faster. Another advantage of ASRock XFast RAM is that it reduces the frequency of accessing your SSDs or HDDs in order to extend their lifespan.

ASRock X-FAN

ASRock X-FAN will be automatically activated only when the system rises to a certain temperature under heavy-loading or overclocking. Normally, ASRock X-FAN will remain deactivated to give users the quietest computing experience. The target temperature and fan speed settings can be configured in the UEFI setup utility.

ASRock Crashless BIOS

ASRock Crashless BIOS allows users to update their BIOS without fear of failing. If power loss occurs during the BIOS update process, ASRock Crashless BIOS will automatically finish the BIOS update procedure after regaining power. Please note that BIOS files need to be placed in the root directory of your USB disk. Only USB2.0 ports support this feature.

ASRock OMG (Online Management Guard)

Administrators are able to establish an internet curfew or restrict internet access at specified times via OMG. You may schedule the starting and ending hours of internet access granted to other users. In order to prevent users from bypassing OMG, guest accounts without permission to modify the system time are required.

ASRock Internet Flash

ASRock Internet Flash searches and updates the latest UEFI firmware version from our servers for you. In other

words, you won't need to enter Windows® OS to waste time on searching for the files or copying the files to an USB device. It will all be done automatically by one click in the UEFI.

ASRock UEFI System Browser

ASRock UEFI system browser is a useful tool included in graphical UEFI. It can detect the devices and configurations that users are currently using in their PC. With the UEFI system browser, you can easily examine the current system configuration in UEFI setup.

ASRock Dehumidifier Function

Users may prevent motherboard damages due to dampness by enabling "Dehumidifier Function". When enabling Dehumidifier Function, the computer will power on automatically to dehumidify the system after entering S4/S5 state.

Lucid Virtu Universal MVP

VIRTU Universal MVP includes the base features of Virtu Universal technology, which virtualizes integrated GPU and discrete GPU for best of breed functionality. It also features Virtual Vsync™ for no-compromise visual quality. With the added benefits of HyperFormance technology, VIRTU Universal MVP improves game performance by intelligently reducing redundant rendering tasks in the flow between the CPU, GPU and the display.

ASRock Interactive UEFI

ASRock Interactive UEFI is a blend of system configuration tools, cool sound effects and stunning visuals. The unprecedented UEFI provides a more attractive interface and more amusment.

ASRock Easy RAID Installer

ASRock Easy RAID Installer can help you to copy the

RAID driver from a support CD to your USB storage device. After copying the RAID driver to your USB storage device, please change “SATA Mode” to “RAID”, then you can start installing the OS in RAID mode.

ASRock Fast Boot

With ASRock’s exclusive Fast Boot technology, it takes less than 1.5 seconds to logon to Windows 8 from a cold boot. No more waiting! The speedy boot will completely change your user experience and behavior.

ASRock Restart to UEFI

Windows® 8 brings the ultimate boot up experience. The lightning boot up speed makes it hard to access the UEFI setup. ASRock Restart to UEFI allows users to easily enter the UEFI automatically when turning on the PC. Just simply enable this function; the PC will enter the UEFI directly after you restart.

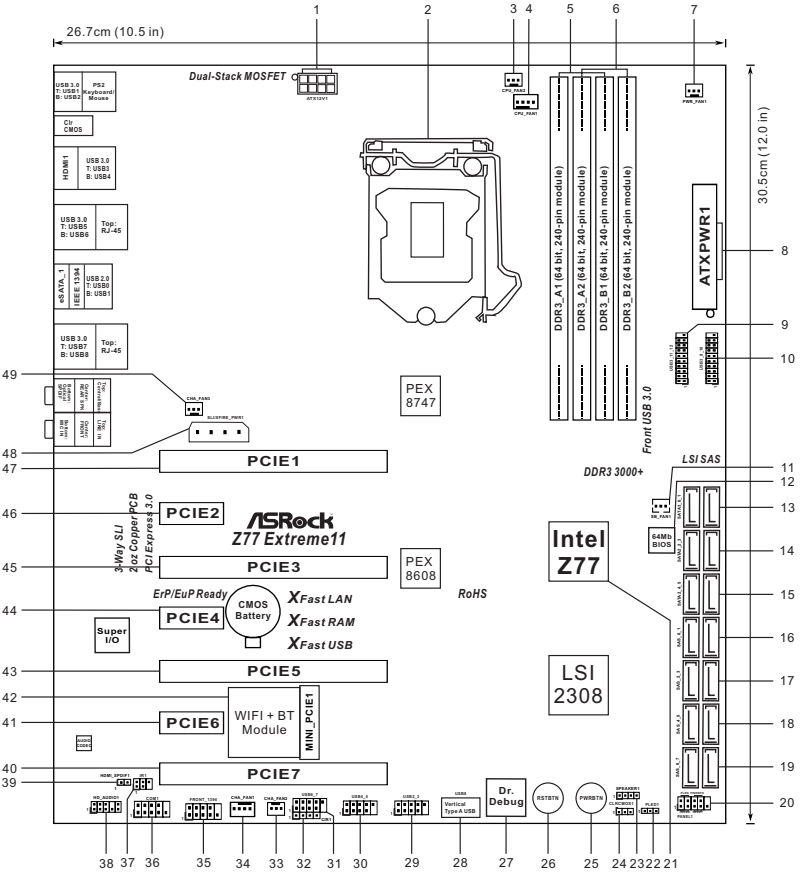
ASRock Good Night LED

ASRock Good Night LED technology can offer you a better environment by extinguishing the unessential LED. By enabling Good Night LED in BIOS, the Power / HDD / LAN LED will be switched off when system is on. Not only this, Good night LED will automatically switch off Power and Keyboard LED when the system enters into Standby / Hibernation mode as well.

Vertical Type A USB

Vertical type USB ports are rarely seen on motherboard designs. This ASRock motherboard is unprecedentedly equipped with a vertical USB 2.0 port named Vertical Type A USB. Besides the USB ports on the rear I/O, Vertical Type A USB is a convenient alternative port for users to plug in devices.

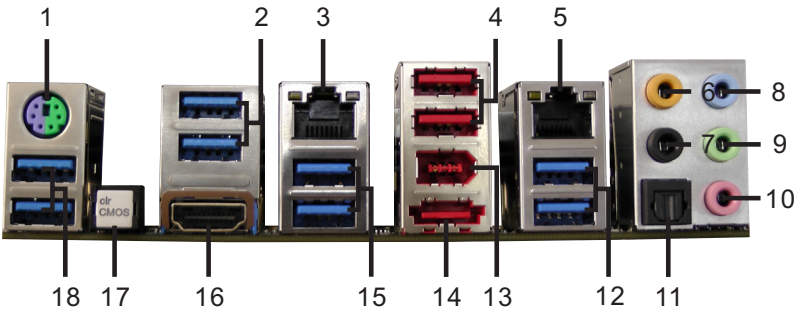
1.4 Motherboard Layout



1 ATX 12V Power Connector (ATX12V1)
2 1155-Pin CPU Socket
3 CPU Fan Connector (CPU_FAN2)
4 CPU Fan Connector (CPU_FAN1)
5 2 x 240-pin DDR3 DIMM Slots (DDR3_A1, DDR3_B1, Black)
6 2 x 240-pin DDR3 DIMM Slots (DDR3_A2, DDR3_B2, Black)
7 Power Fan Connector (PWR_FAN1)
8 ATX Power Connector (ATXPWR1)
9 USB 3.0 Header (USB3_11_12)
10 USB 3.0 Header (USB3_9_10)

11 SB Fan Connector (SB_FAN1)
12 SPI Flash Memory (64Mb)
13 SATA3 Connector (SATA3_0_1, Gray)
14 SATA2 Connector (SATA2_2_3, Black)
15 SATA2 Connector (SATA2_4_5, Black)
16 SAS2/SATA3 Connector (SAS_0_1, Gray)
17 SAS2/SATA3 Connector (SAS_2_3, Gray)
18 SAS2/SATA3 Connector (SAS_4_5, Gray)
19 SAS2/SATA3 Connector (SAS_6_7, Gray)
20 System Panel Header (PANEL1)
21 Intel Z77 Chipset
22 Power LED Header (PLED1)
23 Chassis Speaker Header (SPEAKER1)
24 Clear CMOS Jumper (CLRCMOS1)
25 Power Switch (PWRBTN1)
26 Reset Switch (RSTBTN1)
27 Dr. Debug
28 Vertical Type A USB (USB8)
29 USB 2.0 Header (USB2_3)
30 USB 2.0 Header (USB4_5)
31 USB 2.0 Header (USB6_7)
32 Consumer Infrared Module Header (CIR1)
33 Chassis Fan Connector (CHA_FAN2)
34 Chassis Fan Connector (CHA_FAN1)
35 Front Panel IEEE 1394 Header (FRONT_1394)
36 COM Port Header (COM1)
37 Infrared Module Header (IR1)
38 Front Panel Audio Header (HD_AUDIO1)
39 HDMI_SPDIF Header (HDMI_SPDIF1)
40 PCI Express 2.0 x16 Slot (PCIE7)
41 PCI Express 2.0 x1 Slot (PCIE6)
42 Mini PCI Express Slot (MINI_PCIE1)
43 PCI Express 3.0 x16 Slot (PCIE5)
44 PCI Express 2.0 x1 Slot (PCIE4)
45 PCI Express 3.0 x16 Slot (PCIE3)
46 PCI Express 2.0 x1 Slot (PCIE2)
47 PCI Express 3.0 x16 Slot (PCIE1)
48 SLI/XFIRE Power Connector (SLI/XFIRE_PWR1)
49 Chassis Fan Connector (CHA_FAN3)

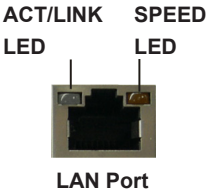
1.5 I/O Panel



1	PS/2 Keyboard/Mouse Port	10	Microphone (Pink)
2	USB 3.0 Ports (USB3_34)	11	Optical SPDIF Out Port
*3	LAN RJ-45 Port	12	USB 3.0 Ports (USB3_78)
4	USB 2.0 Ports (USB01)	13	IEEE 1394 Port (1394)
*5	LAN RJ-45 Port	***14	eSATA3 Connector (eSATA_1)
6	Central / Bass (Orange)	15	USB 3.0 Ports (USB3_56)
7	Rear Speaker (Black)	16	HDMI Port (HDMI1)
8	Line In (Light Blue)	17	Clear CMOS Switch (CLRCBTN1)
**9	Front Speaker (Lime)	18	USB 3.0 Ports (USB3_12)

* There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.

LAN Port LED Indications			
Activity/Link LED		SPEED LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps connection
On	100Mbps connection	Green	1Gbps connection



** If you use a 2-channel speaker, please connect the speaker's plug into "Front Speaker Jack". See the table below for connection details in accordance with the type of speaker you use.

TABLE for Audio Output Connection				
Audio Output Channels	Front Speaker (No. 9)	Rear Speaker (No. 7)	Central / Bass (No. 6)	Line In (No. 8)
2	V	--	--	--
4	V	V	--	--
6	V	V	V	--
8	V	V	V	V

To enable Multi-Streaming, you need to connect a front panel audio cable to the front panel audio header. After restarting your computer, you will find the "Mixer" tool on your system. Please select "Mixer ToolBox" , click "Enable playback multi-streaming", and click "ok".

Choose "2CH", "4CH", "6CH", or "8CH" and then you are allowed to select "Realtek HDA Primary output" to use the Rear Speaker, Central/Bass, and Front Speaker, or select "Realtek HDA Audio 2nd output" to use the front panel audio.

*** eSATA3 connector supports SATA Gen3 in cable 1M.

Chapter 2: Installation

This is an EATX form factor motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

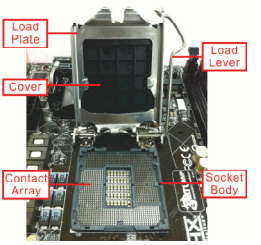
Pre-installation Precautions

Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.
2. In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly on a carpet. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any components, place them on a grounded anti-static pad or in the bag that comes with the components.
5. When placing screws to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

2.1 Installing the CPU

In order to provide the LGA 1155 CPU sockets more protection and make the installation process easier, ASRock has added a new protection cover on top of the load plate to replace the former PnP caps that were under the load plate. For the installation of Intel® 1155-Pin CPUs with the new protection cover, please follow the steps below.



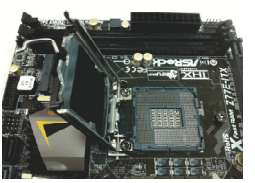
1155-Pin Socket Overview

Before you insert the 1155-Pin CPU into the socket, please check if the CPU surface is unclean or if there are any bent pins in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.

Step 1. Open the socket:

Step 1-1. Disengage the lever by pressing it down and sliding it out of the hook. You do not have to remove the protection cover.

Step 1-2. Keep the lever positioned at about 135 degrees in order to flip up the load plate.

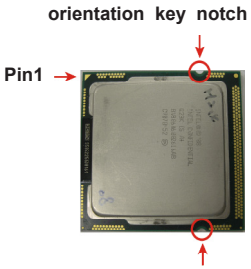


Step 2. Insert the 1155-Pin CPU:

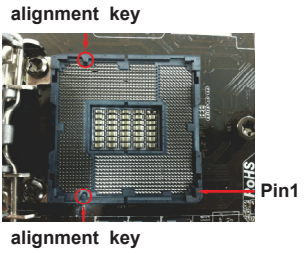
Step 2-1. Hold the CPU by the edge which is marked with a black line.

Step 2-2. Orient the CPU with the Integrated Heat Sink up. Locate Pin1 and the two orientation key notches.

black line



1155-Pin CPU



1155-Pin Socket

For proper installation, please ensure to match the two orientation key notches of the CPU with the two alignment keys of the socket.

Step 2-3. Carefully place the CPU into the socket.

Step 2-4. Verify that the CPU is within the socket and properly mated to the orient keys.

Step 3. Close the socket:

Step 3-1. Flip the load plate onto the IHS.

Step 3-2. Press down the load lever, and secure it with the load plate tab under the retention tab. The protection cover will automatically come off by itself.

Please save and replace the cover if the processor is removed. The cover must be placed if you wish to return the motherboard for after service.

2.2 Installing the CPU Fan and Heatsink

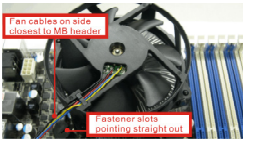
This motherboard is equipped with 1155-Pin socket that supports Intel 1155-Pin CPUs. Please adopt the type of heatsink and cooling fan compliant with Intel 1155-Pin CPU to dissipate heat. Before you install the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation. Ensure that the CPU and the heatsink are securely fastened and in good contact with each other. Then connect the CPU fan to the CPU_FAN connector (CPU_FAN1, see p.16, No. 4 or CPU_FAN2, see p.16, No. 3).

For proper installation, please kindly refer to the instruction manuals of your CPU fan and heatsink.

Below is an example to illustrate the installation of a heatsink and fan for 1155-Pin CPUs.

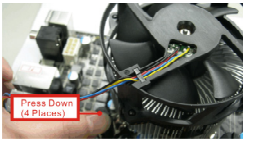
Step 1. Apply thermal interface material onto the center of the IHS on the socket's surface.

Step 2. Place the heatsink onto the socket. Ensure that the fan cables are faced on the side closest to the CPU fan connector on the motherboard (CPU_FAN1, see p.16, No. 4 or CPU_FAN2, see p.16, No. 3).



Step 3. Align the fasteners with the holes on the motherboard.

Step 4. Rotate the fastener clockwise, then press the fastener caps down with your thumb to install and lock. Repeat with the remaining fasteners.



If you press down the fasteners without rotating them clockwise, the heatsink cannot be secured on the motherboard.

Step 5. Connect the CPU fan connector with the fan header on the motherboard.

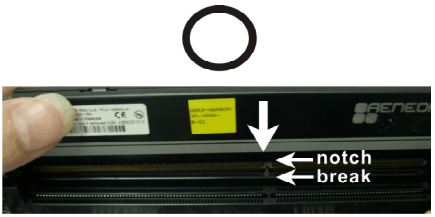
Step 6. Secure redundant cable with tie-wrap to ensure that the cable does not interfere with the fan's operation or contact other components.

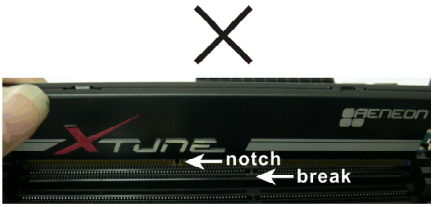
2.3 Installing Memory Modules (DIMM)

This motherboard provides four 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Dual Channel Memory Technology. For dual channel configuration, you always need to install **identical** (the same brand, speed, size and chip-type) DDR3 DIMM pairs.

1. It is unable to activate Dual Channel Memory Technology with only one memory module installed.
2. It is not allowed to install a DDR or DDR2 memory module into a DDR3 slot; otherwise, this motherboard and DIMM may be damaged.

Step 1. Unlock a DIMM slot by pressing the retaining clips outward.
Step 2. Align a DIMM on the slot such that the notch on the DIMM matches the break on the slot.





The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

Step 3. Firmly insert the DIMM into the slot until the retaining clips at both ends fully snap back in place and the DIMM is properly seated.

2.4 Expansion Slots (PCI Express Slots)

There are 7 PCI Express slots and 1 mini_PCI Express slot on this motherboard.

Mini-PCIE Slots: MINI_PCIE1 is used for mini-PCIE cards.

PCIE slots: PCIE2, PCIE4 and PCIE6 (PCIE 2.0 x1 slots) are used for PCI Express x1 lane width cards, such as a Gigabit LAN card or SATA2 cards, etc.

PCIE1 (PCIE 3.0 x16 slot) is used for PCI Express x16 lane width graphics cards.

PCIE3 and PCIE5 (PCIE 3.0 x16 slot) are used for PCI Express x8 lane width graphics cards, or used to install PCI Express graphics cards to support CrossFireX™ or SLI™.

PCIE7 (PCIE 2.0 x16 slot) is used for PCI Express x4 lane width graphics cards or ASRock Game Blaster.

PCIE Slot Configurations

	PCIE1	PCIE3	PCIE5	PCIE7
Single Graphics Card	x16	N/A	N/A	N/A
Two Graphics Cards in CrossFireX™ or SLI™ Mode	x8	N/A	x8	N/A
Three Graphics Cards in 3-Way CrossFireX™ or 3-Way SLI™ Mode	x8	x8	x8	N/A
Four Graphics Cards in 4-Way CrossFireX™	x8	x8	x8	x4

1. For better thermal environment, please connect a chassis fan to the motherboard's chassis fan connector (CHA_FAN1, CHA_FAN2 or CHA_FAN3) when using multiple graphics cards.
2. Only PCIE1, PCIE3 and PCIE5 slots support Gen 3 speed. To run PCI Express in Gen 3 speed, please install an Ivy Bridge CPU. If you install a Sandy Bridge CPU, the PCI Express will run only at PCI Express Gen 2 speed.

Installing an Expansion Card

Step 1. Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

Step 2. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

Step 3. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

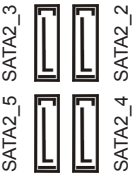
Step 4. Fasten the card to the chassis with screws.

2.5 Installing Serial SATA / SATA2 / SATA3 Hard Disks

STEP 1: Connect the SATA power cable to the hard disk.
STEP 2: Connect one end of the SATA data cable to the hard disk.

STEP 3: Connect the other end of the SATA data cable to the motherboard's SAS2 / SATA2 / SATA3 connectors.

Serial ATA2 Connectors
(SATA2_2_3:
see p.16, No. 14)
(SATA2_4_5:
see p.16, No. 15)

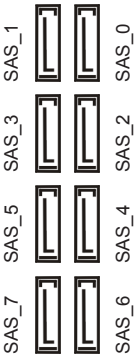


These four Serial ATA2 (SATA2) connectors support SATA data cables for internal storage devices. The current SATA2 interface allows up to 3.0 Gb/s data transfer rate.

Serial ATA3 Connectors
(SATA3_0_1:
see p.16, No. 13)

These two Serial ATA3 (SATA3) connector supports SATA data cables for internal storage devices. The current SATA3 interface allows up to 6.0 Gb/s data transfer rate. If the eSATA3 port on the rear I/O has been connected, the internal SATA3_1 will not function.

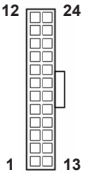
SAS2/Serial ATA3 Connectors
(SAS_0_1: see p.16, No. 16)
(SAS_2_3: see p.16, No. 17)
(SAS_4_5: see p.16, No. 18)
(SAS_6_7: see p.16, No. 19)



These eight SAS2/Serial ATA3 (SATA3) connectors support SAS/SATA data cables for internal storage devices. The current SAS2/SATA3 interface allows up to 6.0 Gb/s data transfer rate. We recommend using Intel® Z77 SATA2 ports instead of SAS ports for your ODDs. For connecting SAS HDDs, please contact SAS data cable dealers.

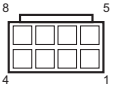
2.6 Power Connectors

ATX Power Connector
(24-pin ATXPWR1)
(see p.16, No. 8)



Though this motherboard provides a 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use a 20-pin ATX power supply, please plug your power supply along Pin 1 and Pin 13.

ATX 12V Power Connector
(8-pin ATX12V1)
(see p.16, No. 1)



Though this motherboard provides 8-pin ATX 12V power connector, it can still work if you adopt a traditional 4-pin ATX 12V power supply. To use the 4-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 5.

SLI/XFIRE Power Connector
(4-pin SLI/XFIRE_PWR1)
(see p.16, No. 48)

It is not necessary to use this connector, but please connect it with a hard disk power connector when two graphics cards are plugged to this motherboard.

2.7 Installing the System Panel

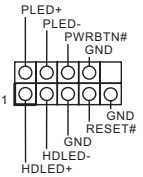
Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

PWRBTN (Power Switch):
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.
PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).
HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

The white wires are negative (Connect to - or GND pins), while the colored ones are positive.

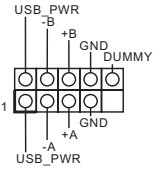
System Panel Header
(9-pin PANEL1)
(see p.16, No. 20)



2.8 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard!

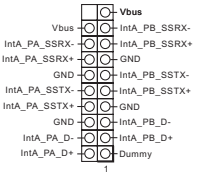
USB 2.0 Headers
(9-pin USB2_3)
(see p.16, No. 29)
(9-pin USB4_5)
(see p.16, No. 30)
(9-pin USB6_7)
(see p.16, No. 31)



(USB8)
(see p.16, No. 28)

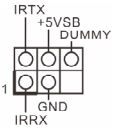
Besides two default USB 2.0 ports on the I/O panel, there are three USB 2.0 headers and one USB port on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

USB 3.0 Headers
(19-pin USB3_11_12)
(see p.16, No. 9)
(19-pin USB3_9_10)
(see p.16, No. 10)



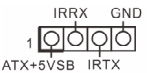
Besides eight default USB 3.0 ports on the I/O panel, there are two USB 3.0 header on this motherboard. Each USB 3.0 header can support two USB 2.0 ports.

Infrared Module Header
(5-pin IR1)
(see p.16, No. 37)



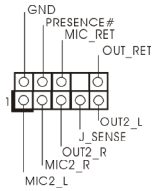
This header supports an optional wireless transmitting and receiving infrared module.

Consumer Infrared Module Header
(4-pin CIR1)
(see p.16, No. 32)



This header can be used to connect the remote controller receiver.

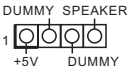
Front Panel Audio Header
(9-pin HD_AUDIO1)
(see p.16, No. 38)



This is an interface for the front panel audio cable that allows convenient connection and control of audio devices.

1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.
2. If you use an AC'97 audio panel, please install it to the front panel audio header by the steps below:
   A. Connect Mic_IN (MIC) to MIC2_L.
   B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
   C. Connect Ground (GND) to Ground (GND).
   D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.
   E. To activate the front mic.
   For Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS:
   Go to the "FrontMic" Tab in the Realtek Control panel. Adjust "Recording Volume".

Chassis Speaker Header
(4-pin SPEAKER1)
(see p.16, No. 23)



Please connect the chassis speaker to this header.

Power LED Header
(3-pin PLED1)
(see p.16, No. 22)

Please connect the chassis power LED to this header to indicate system power status. The LED is on when the system is operating. The LED keeps blinking in S1/S3 state. The LED is off in S4 state or S5 state (power off).

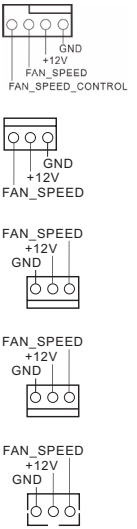
Chassis, Power and SB Fan Connectors
(4-pin CHA_FAN1)
(see p.16, No. 34)

(3-pin CHA_FAN2)
(see p.16, No. 33)

(3-pin CHA_FAN3)
(see p.16, No. 49)

(3-pin PWR_FAN1)
(see p.16, No. 7)

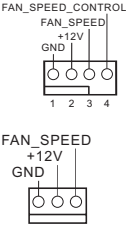
(3-pin SB_FAN1)
(see p.16, No. 11)



Please connect fan cables to the fan connectors and match the black wire to the ground pin.

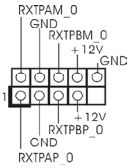
CPU Fan Connectors
(4-pin CPU_FAN1)
(see p.16, No. 4)

(3-pin CPU_FAN2)
(see p.16, No. 3)



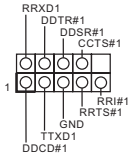
Though this motherboard provides a 4-Pin CPU fan (Quiet Fan) connector, 3-Pin CPU fans can still work successfully even without fan speed control. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

IEEE 1394 Header
(9-pin FRONT_1394)
(see p.16, No. 35)



Besides one default IEEE 1394 port on the I/O panel, there is one IEEE 1394 header on this motherboard. This IEEE 1394 header can support one IEEE 1394 port.

Serial Port Header
(9-pin COM1)
(see p.16, No. 36)



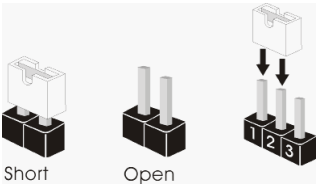
This COM1 header supports a serial port module.

HDMI_SPDIF Header
(2-pin HDMI_SPDIF1)
(see p.16, No. 39)

This header provides SPDIF audio output to HDMI VGA cards, allowing the system to connect HDMI Digital TV/projector/LCD devices. Please connect the HDMI_ SPDIF connector of a HDMI VGA card to this header.

2.9 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when a jumper cap is placed on these 2 pins.



Clear CMOS Jumper
(CLRCMOS1)
(see p.16, No. 24)

CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, user default profile, 1394 GUID and MAC address will be cleared only if the CMOS battery is removed.

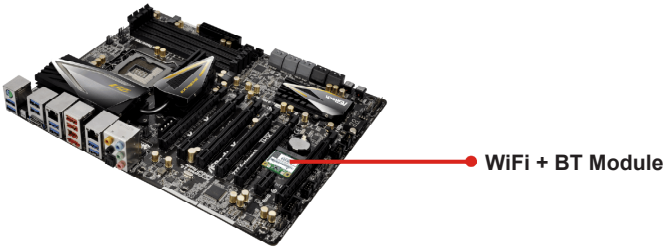
The Clear CMOS Switch has the same function as the Clear CMOS jumper.

2.10 WiFi + BT Module and ASRock Wi-SB Box

WiFi + BT Module

This motherboard comes with an exclusive WiFi 802.11 a/b/g/n + BT v4.0 module that offers support for WiFi 802.11 a/b/g/n connectivity standards and Bluetooth v4.0. WiFi + BT module is an easy-to-use wireless local area network (WLAN) adapter to support WiFi + BT. Bluetooth v4.0 standard features Smart Ready technology that adds a whole new class of functionality into the mobile devices including Apple's most recent iPhone 4S. BT 4.0 also includes Low Energy Technology and ensures extraordinary low power consumption for PCs. The 2T2R WiFi solution sets a WiFi high speed standard and offers max link rate up to 300Mbps. Compared to other 1T1R WiFi motherboards with 150Mbps, ASRock's 2T2R WiFi solution drives up to 2X faster.

* The transmission speed may vary according to the environment.
* The WiFi + BT module is supported under Windows® 8 / 8 64-bit / 7 / 7 64-bit only.



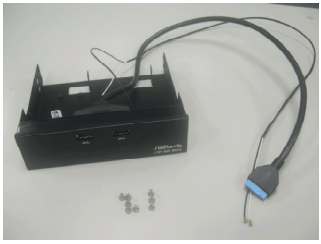
ASRock Wi-SB Box

Thanks to the excellent placement of antennas, ASRock Wi-SB Box comes with two invisible antennas (placed in a vertical/horizontal position), hidden inside the front panel that provides the most stable and unrestricted-direction wireless network coverage, optimized for maximum broadband network. Additionally, it provides two Front USB 3.0 ports for easier USB 3.0 device access and 1 rack for SSD placement.

ASRock Wi-SB Box

Installing the WiFi + BT Module and ASRock Wi-SB Box

Step 1. Prepare the bundled ASRock Wi-SB Box and screws.

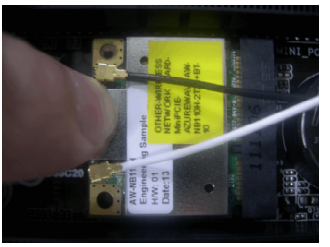


Step 2. If you have 2.5” HDD/SSDs, you may insert up to two and secure them in ASRock Wi-SB Box with screws.

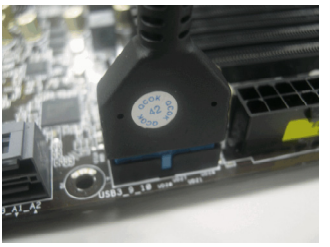
Step 3. Install ASRock Wi-SB Box into the drive bay of the chassis.

Step 4. Screw ASRock Wi-SB Box to the drive bay with screws.

Step 5. Attach the cords to the WiFi + BT module on your motherboard.



Step 6. Plug the Front USB 3.0 cable into the USB 3.0 header on the motherboard.



2.11 Operating System Setup

This motherboard supports various Microsoft® Windows® operating systems: 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer your OS documentation for more information.

2.11.1 Installing Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit without RAID

Using AHCI Mode

STEP 1: Set Up UEFI.
Press <F2> or <Delete> at system POST. Set **AHCI Mode** in UEFI Setup Utility > Advanced > Storage Configuration > SATA Mode.

STEP 2: Install Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit on your system.

Using IDE Mode

STEP 1: Set Up UEFI.
Press <F2> or <Delete> at system POST. Set **IDE Mode** in UEFI Setup Utility > Advanced > Storage Configuration > SATA Mode.

STEP 2: Install Windows® 8 / 8 64-biy / 7 / 7 64-bit / Vista™ / Vista™ 64-bit on your system.

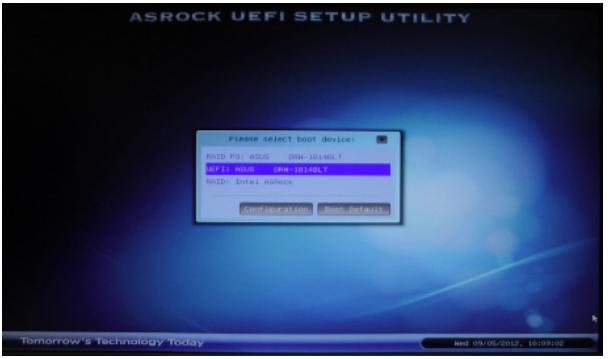
2.11.2 Installing Windows® 8 64-bit / 7 64-bit / Vista™ 64-bit on a HDD Larger than 2 terabytes (2TB) without RAID

This motherboard adopts UEFI BIOS that allows Windows® OS to be installed on a large size HDD (>2TB). Please make sure to use Windows® Vista™ 64-bit (with SP2 or above), 7 64-bit or 8 64-bit and follow the procedures below to install the operating system.

Using AHCI Mode

STEP 1: Set Up UEFI.
Press <F2> or <Delete> at system POST. Set **AHCI Mode** in UEFI Setup Utility > Advanced > Storage Configuration > SATA Mode.

STEP 2: Press <F11> to launch boot menu at system POST and choose the item "UEFI:<Optical disk drive>" to boot.



STEP 3: Start Windows® installation.

2.11.3 Installing Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit with RAID

STEP 1: Set Up UEFI.

Press <F2> or <Delete> at system POST. Set **RAID Mode** in UEFI Setup Utility > Advanced > Storage Configuration > SATA Mode.

STEP 2: Use "RAID Installation Guide" to set the RAID configuration.

Before you start to configure RAID, you need to check the installation guide in the Support CD for proper configuration. Please refer to the document in the Support CD, "Guide to SATA Hard Disks Installation and RAID Configuration", which is located in the folder at the following path:
.. \ RAID Installation Guide

STEP 3: Install Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit on your system.

2.12 Installing Drivers

The Support CD that comes with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's features.

2.12.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu does not appear automatically, locate and double click on the file "ASRSETUP.EXE" in the Support CD to display the menu.

2.12.2 Drivers Menu

The drivers compatible to your system will be auto-detected and listed on the support CD driver page. Please follow the order from top to bottom to install those required drivers. Therefore, the drivers you install can work properly.

2.12.3 Utilities Menu

The Utilities Menu shows the application softwares that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

2.12.4 Contact Information

If you need to contact ASRock or want to know more about ASRock, you're welcome to visit ASRock's website at http://www.asrock.com; or you may contact your dealer for further information.

2.13 Smart Switches

The motherboard has three smart switches: Power Switch, Reset Switch and Clear CMOS Switch, allowing users to quickly turn on/off the system, reset the system or clear the CMOS values.

Power Switch (PWRBTN) (see p.16, No. 25)		Power Switch allows users to quickly turn on/off the system.
Reset Switch (RSTBTN) (see p.16, No. 26)		Reset Switch allows users to quickly reset the system.
Clear CMOS Switch (CLRCBTN) (see p.18, No. 17)		Clear CMOS Switch allows users to quickly clear the CMOS values.

2.14 Dr. Debug

Dr. Debug is used to provide code information, which makes troubleshooting even easier. Please see the diagrams below for reading the Dr. Debug codes.

Code	Description
00	Please check if the CPU is installed correctly and then clear CMOS.
0d	Problem related to memory, VGA card or other devices. Please clear CMOS, re-install the memory and VGA card, and remove other USB, PCI devices.
01 - 54 (except 0d), 5A- 60	Problem related to memory. Please re-install the CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
55	The Memory could not be detected. Please re-install the memory and CPU. If the problem still exists, please install only one memory module or try using other memory modules.
61 - 91	Chipset initialization error. Please press reset or clear CMOS.
92 - 99	Problem related to PCI-E devices. Please re-install PCI-E devices or try installing them in other slots. If the problem still exists, please remove all PCI-E devices or try using another VGA card.
A0 - A7	Problem related to IDE or SATA devices. Please re-install IDE and SATA devices. If the problem still exists, please clear CMOS and try removing all SATA devices.
b0	Problem related to memory. Please re-install the CPU and memory. If the problem still exists, please install only one memory module or try using other memory modules. * For X79 models, please try installing memory to DDR3 A1, B1, C1 and D1 slots.
b4	Problem related to USB devices. Please try removing all USB devices.

b7	Problem related to memory. Please re-install the CPU and memory then clear CMOS. If the problem still exists, please install only one memory module or try using other memory modules.
d6	The VGA could not be recognized. Please clear CMOS and try re-installing the VGA card. If the problem still exists, please try installing the VGA card in other slots or use other VGA cards.
d7	The Keyboard and mouse could not be recognized. Please try re-installing the keyboard and mouse.
d8	Invalid Password.
FF	Please check if the CPU is installed correctly and then clear CMOS.

2.15 SLI™, 3-Way SLI™ and Quad SLI™ Operation Guide

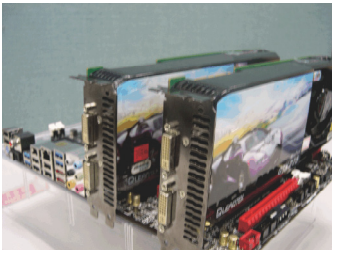
This motherboard supports NVIDIA® SLI™, 3-Way SLI™ and Quad SLI™ (Scalable Link Interface) technology that allows you to install up to three identical PCI Express x16 graphics cards. Currently, NVIDIA® SLI™, 3-Way SLI™ and Quad SLI™ technology supports Windows® Vista™ / Vista™ 64-bit / 7 / 7 64-bit / 8 / 8 64-bit OS.

Requirements

1. You should only use identical SLI™-ready graphics cards that are NVIDIA® certified.
2. Make sure that your graphics card driver supports NVIDIA® SLI™ technology. Download the drivers from the NVIDIA® website: www.nvidia.com
3. Make sure that your power supply unit (PSU) can provide at least the minimum power your system requires. It is recommended to use a NVIDIA® certified PSU. Please refer to the NVIDIA® website for details.

2.15.1 Installing Two SLI™-Ready Graphics Cards

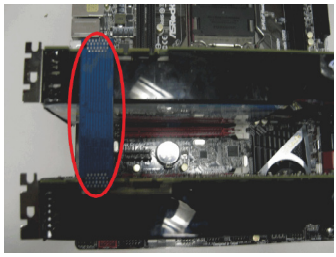
Step 1. Insert one graphics card into PCIE1 slot and the other graphics card to PCIE5 slot. Make sure that the cards are properly seated on the slots.



Step 2. If required, connect the auxiliary power source to the PCI Express graphics cards.

Step 3. Align and insert the ASRock SLI_Bridge_3S Card to the gold-fingers on each graphics card. Make sure the ASRock SLI_ Bridge_3S Card is firmly in place.

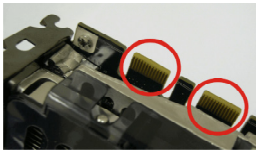
ASRock SLI_Bridge_3S Card



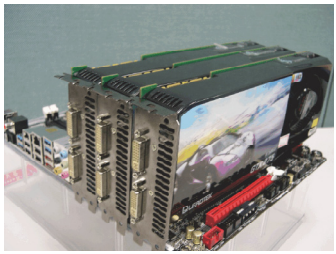
Step 4. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE1 slot.

2.15.2 Installing Three SLI™-Ready Graphics Cards

Step 1. Each graphics card should have two goldfingers for the 3-Way SLI Bridge connector. Insert one graphics card into PCIE1 slot, another graphics card to PCIE3 slot, and the other graphics card to PCIE5 slot. Make sure that the cards are properly seated on the slots.



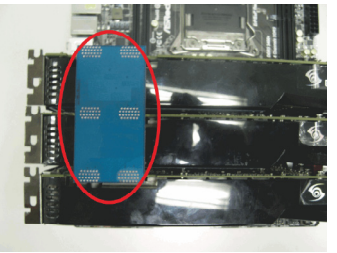
Two Goldfingers



Step 2. Connect the auxiliary power source to the PCI Express graphics card. Please make sure that both power connectors on the PCI Express graphics card are connected. Repeat this step on the three graphics cards.

Step 3. Align and insert the ASRock 3-Way SLI Bridge Card to the gold-fingers on each graphics card. Make sure the ASRock 3-Way SLI Bridge Card is firmly in place.

ASRock 3-Way SLI Bridge Card



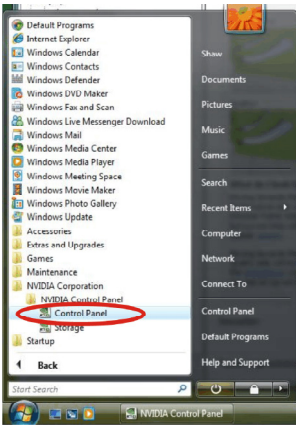
Step 4. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE1 slot.

2.15.3 Driver Installation and Setup

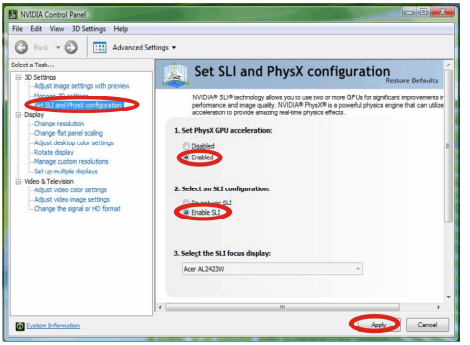
Install the graphics card drivers to your system. After that, you can enable the Multi-Graphics Processing Unit (GPU) in the NVIDIA® nView system tray utility. Please follow the below procedures to enable the multi-GPU.

For SLI™ and Quad SLI™ mode

A. Click the **Start** icon on your Windows taskbar.
B. From the pop-up menu, select **All Programs**, and then click **NVIDIA Corporation**.
C. Select **NVIDIA Control Panel** tab.
D. Select **Control Panel** tab.



E. From the pop-up menu, select **Set SLI and PhysX configuration**. In **Set PhysX GPU acceleration** item, please select **Enabled**.
F. In **Select an SLI configuration** item, please select **Enable SLI**. And click **Apply**.



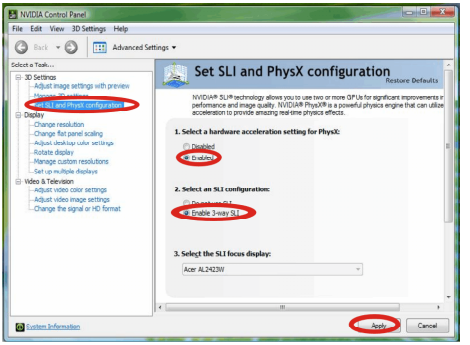
G. Reboot your system.

H. You can freely enjoy the benefits of SLI™ or Quad SLI™.

For 3-Way SLI™ mode

A. Follow steps A to E on the previous page.

B. In **Select an SLI configuration** item, please select **Enable 3-way SLI** and click **Apply**.



C. Reboot your system.

D. You can freely enjoy the benefits of 3-Way SLI™.

* SLI™ appearing here is a registered trademark of NVIDIA® Technologies Inc., and is used only for identification or explanation and to the owners' benefit, without intent to infringe.

2.16 CrossFireX™, 3-Way CrossFireX™, 4-Way CrossFireX™ and Quad CrossFireX™ Operation Guide

This motherboard supports CrossFireX™, 3-way CrossFireX™, 4-way CrossFireX™ and Quad CrossFireX™ that allows you to install up to four identical PCI Express x16 graphics cards. Currently CrossFireX™, 3-way CrossFireX™, 4-way CrossFireX™ and Quad CrossFireX™ are supported with Windows® Vista™ / Vista™ 64-bit / 7 / 7 64-bit / 8 / 8 64-bit OS.

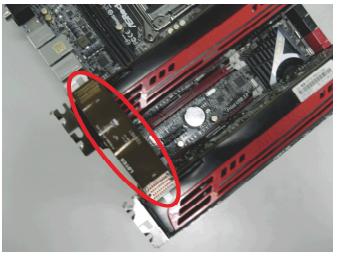
1. You should only use identical CrossFireX™-ready graphics cards that are AMD certified.
2. Make sure that your graphics card driver supports AMD CrossFireX™ technology. Download the drivers from the AMD's website: www.amd.com
3. Make sure that your power supply unit (PSU) can provide at least the minimum power your system requires. It is recommended to use a AMD certified PSU. Please refer to the AMD's website for details.
4. If you pair a 12-pipe CrossFireX™ Edition card with a 16-pipe card, both cards will operate as 12-pipe cards while in CrossFireX™ mode.
5. Different CrossFireX™ cards may require different methods to enable CrossFireX™. Please refer to AMD graphics card manuals for detailed installation guide.

2.16.1 Installing Two CrossFireX™-Ready Graphics Cards

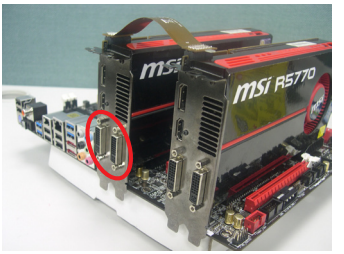
Step 1. Insert one graphics card into PCIE1 slot and the other graphics card to PCIE5 slot. Make sure that the cards are properly seated on the slots.

Step 2. Connect two graphics cards by installing a CrossFire Bridge on the CrossFire Bridge Interconnects on the top of the graphics cards. (The CrossFire Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.)

CrossFire Bridge



Step 3. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE1 slot.

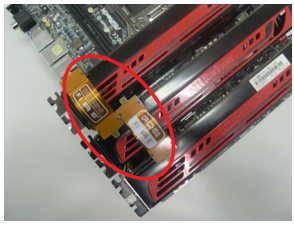


2.16.2 Installing Three CrossFireX™-Ready Graphics Cards

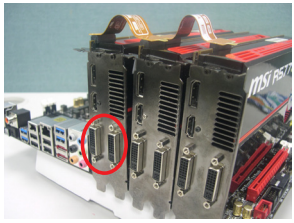
Step 1. Insert one graphics card into PCIE1 slot, another graphics card to PCIE3 slot, and the other graphics card to PCIE5 slot. Make sure that the cards are properly seated on the slots.

Step 2. Use one CrossFire™ Bridge to connect the graphics cards on PCIE1 and PCIE3 slots, and use the other CrossFire™ Bridge to connect the graphics cards on PCIE3 and PCIE5 slots. (The CrossFire™ Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.)

CrossFire™ Bridge



Step 3. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE1 slot.

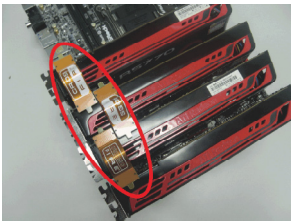


2.16.3 Installing Four CrossFireX™-Ready Graphics Cards

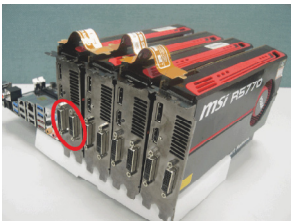
Step 1. Insert one graphics card into PCIE1 slot, another graphics card into PCIE3 slot, the third graphics card into PCIE5 slot and the last graphics card into PCIE7 slot. Make sure that the cards are properly seated on the slots.

Step 2. Use one CrossFire™ Bridge to connect the graphics cards on PCIE1 and PCIE3 slots, another CrossFire™ Bridge to connect the graphics cards on PCIE3 and PCIE5 slots, and use the third CrossFire™ Bridge to connect the graphics cards on PCIE5 and PCIE7 slots. (The CrossFire™ Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.)

CrossFire™ Bridge



Step 3. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE1 slot.



2.16.4 Driver Installation and Setup

Step 1. Power on your computer and boot into OS.

Step 2. Remove the AMD drivers if you have any VGA drivers installed in your system.

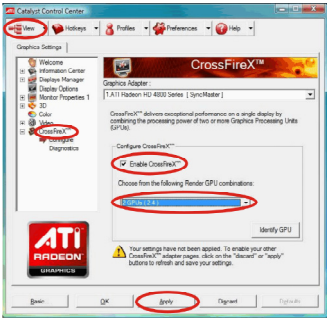
The Catalyst Uninstaller is an optional download. We recommend using this utility to uninstall any previously installed Catalyst drivers prior to installation. Please check AMD's website for AMD driver updates.

Step 3. Install the required drivers and CATALYST Control Center then restart your computer. Please check AMD's website for details.

Step 4. You will find "AMD Catalyst Control Center" on your Windows® taskbar.

AMD Catalyst Control Center

Step 5. Double-click "AMD Catalyst Control Center". Click "View", select "CrossFireX™", and then check the item "Enable CrossFireX™". If you installed two graphics cards, select "2 GPUs" and click "Apply". If you installed three graphics cards, select "3 GPUs" and click "Apply". If you installed four graphics cards, select "4 GPUs" and click "Apply".



2.17 Surround Display

This motherboard supports surround display upgrade. With the internal VGA output support (HDMI) and external add-on PCI Express VGA cards, you can easily enjoy surround display.
Please refer to the following steps to set up a surround display environment:

1. Install the VGA cards on the PCIE slots. Please refer to **Installing Memory Modules** for details of proper expansion card installation procedures.
2. Connect monitor cables to the corresponding connectors of the rear I/O and the add-on PCI Express VGA cards.
3. Install the onboard VGA driver and the add-on PCI Express VGA card drivers to your system. If you have installed the drivers already, there is no need to install them again.
4. Set up a multi-monitor display.

   For Windows® 8 / 8 64-bit / 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS:

   Right click the desktop, choose “Personalize”, and select the “Display Settings” tab so that you can adjust the parameters of the multi-monitor according to the steps below.

   A. Click the number ”2” icon.
   B. Click the items “This is my main monitor” and “Extend the desktop onto this monitor”.
   C. Click “OK” to save your change.
   D. Repeat steps A through C for the display icon identified by the numbers.

6. Use Surround Display. Click and drag the display icons to positions representing the physical setup of your monitors that you would like to use. The placement of display icons determines how you move items from one monitor to another.

2.18 Hot Plug and Hot Swap for Hard Disk Drives

This motherboard supports Hot Plug and Hot Swap for SAS2 / SATA2 / SATA3 in AHCI / RAID mode.

What is Hot Plug and Hot Swap?

If the HDDs are NOT set for RAID, it is called “Hot Plug” for the action to insert and remove the HDDs while the system is still powered on and in working condition. If the HDDs are set for RAID then it is called “Hot Swap”. However, please note that it cannot perform Hot Plug or Hot Swap if the OS has been installed into the HDD.

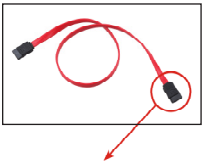
Hot Plug / Hot Swap Operation Guide

Please read the operation guide of Hot Plug / Hot Swap below carefully. Before you process Hot Plug / Hot Swap, please check the cable accessories from the motherboard gift box pack below.

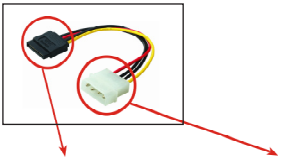
A. 7-pin SATA data cable

B. SATA power cable with SATA 15-pin power connector interface

A. SATA data cable (Red)



B. SATA power cable



SATA 7-pin connector	The SATA 15-pin power connector (Black) should be connected to your SATA3 HDD	The 1x4-pin conventional power connector (White) should be connected to a power supply

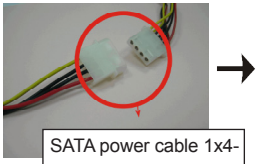
Points for attention, before you process Hot Plug / Hot Swap:

1. Without the SATA 15-pin power connector interface, Hot Plug / Hot Swap cannot be processed.
2. Even though some HDDs provide both SATA 15-pin power connectors and IDE 1x4-pin conventional power connectors, IDE 1x4-pin conventional power connector's interface is definitely unable to support Hot Plug / Hot Swap and will cause the HDD damage and data loss.
3. The operation procedure below is designed only for our motherboard which supports Hot Plug / Hot Swap.
   * Hot Plug / Hot Swap might not be supported by the chipset because of its limitation. The support information of our motherboards are indicated in the product spec on our website: www.asrock.com
4. Make sure your HDDs can support Hot Plug / Hot Swap from your dealer or HDD user manual. HDDs that do not support Hot Plug / Hot Swap will be damaged.
5. Please make sure that the required SATA drivers are installed properly. The latest SATA drivers are available on our support website: www.asrock.com
6. Make sure to use the SATA power cable & data cable from our motherboard package.
7. Please follow the instructions below step by step to reduce the risk of HDD crash or data loss.

How to Hot Plug / Hot Swap a HDD:

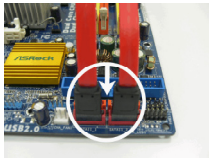
Please follow the instructions below to process Hot Plug / Hot Swap. Improper procedures will cause the HDD damage and data loss.

Step *1* Please connect the SATA power cable's 1x4-pin end (White) to the power supply's 1x4-pin cable.



SATA power cable 1x4-pin power connector (White)

Step *2* Connect the SATA data cable to the motherboard's SATA connector.



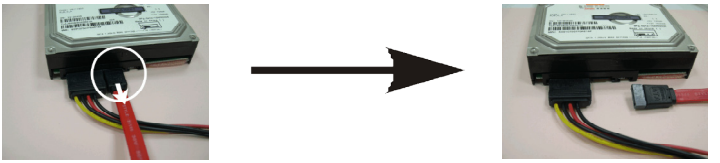
Step *3* Connect the SATA 15-pin power cable connector's (Black) end to the HDD.

Step *4* Connect the SATA data cable to the HDD.

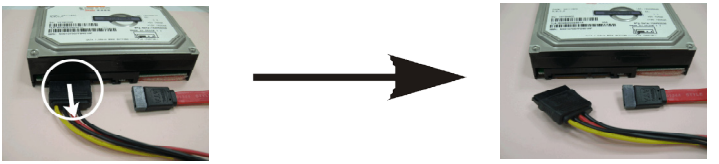
How to Hot Unplug / Hot Swap a HDD:

Please follow the instructions below to process Hot Unplug / Hot Swap. Improper procedures will cause the HDD damage and data loss.

Step *1* Unplug the SATA data cable from the HDD's side.



Step *2* Unplug the SATA 15-pin power cable connector (Black) from the HDD's side.



2.19 Dual LAN and Teaming Operation Guide

Dual LAN with Teaming enabled on this motherboard allows two single connections to act as one single connection for twice the transmission bandwidth, making data transmission more effective and improving the quality of transmission of distant images. Fault tolerance on the dual LAN network prevents network downtime by transferring the workload from a failed port to a working port.

The speed of transmission is subject to the actual network environment or status even with Teaming enabled.

Before setting up Teaming, please make sure whether your Switch (or Router) supports Teaming (IEEE 802.3ad Link Aggregation). You can specify a preferred adapter in Intel PROSet. Under normal conditions, the Primary adapter handles all non-TCP/IP traffic. The Secondary adapter will receive fallback traffic if the primary fails. If the Preferred Primary adapter fails, but is later restored to an active status, control is automatically switched back to the Preferred Primary adapter.

1. From Device Manager, open the properties of a team.

2. Click the Settings tab.

3. Click the Modify Team button.

4. Select the adapter you want to be the primary adapter and click the Set Primary button.

If you do not specify a preferred primary adapter, the software will choose an adapter of the highest capability (model and speed) to act as the default primary. If a failover occurs, another adapter becomes the primary. The adapter will, however, rejoin the team as a non-primary.

Chapter 3: UEFI SETUP UTILITY

3.1 Introduction

ASRock Interactive UEFI is a blend of system configuration tools, cool sound effects and stunning visuals. Not only will it make BIOS setup less difficult but also a lot more amusing.This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY, otherawise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Main	For setting system time/date information
OC Tweaker	For overclocking configurations
Advanced	For advanced system configurations
Tool	Useful tools
H/W Monitor	Displays current hardware status
Boot	For configuring boot settings and boot priority
Security	For security settings
Exit	Exit the current screen or the UEFI Setup Utility

3.1.2 Navigation Keys

Use < ← > key or < → > key to choose among the selections on the menu bar, and use < ↑ > key or < ↓ > key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

Please check the following table for the descriptions of each navigation key.

Navigation Key(s)	Description
+ / -	To change option for the selected items
<Tab>	Switch to next function
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F4>	Toggle sound on/off
<F7>	Discard changes and exit the SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

3.2 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.

Active Page on Entry

This allows you to select the default page when entering the UEFI setup utility.

3.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.

Advanced Turbo 30

You can use this to increase your system's performance. This option appears only when you adopt a K-Series CPU that supports this function.

Load Optimized CPU OC Setting

You can use this to load optimized CPU overclocking settings. Please note that overclocing may cause damage to your CPU and motherboard. It should be done at your own risk and expense. This option appears only when you adopt a K-Series CPU.

Load Optimized GPU OC Setting

You can use this to load optimized GPU overclocking settings. Please note that overclocing may cause damage to your GPU and motherboard. It should be done at your own risk and expense. This option appears only when you adopt a K-Series CPU.

No-K OC

Use this to enable or disable No-K OC. The performance of every CPU differs, we cannot guarantee every CPU's overclocking ability. Applying too much voltage to the CPU may cause damages to both the CPU and the motherboard, please select an appropriate voltage for your CPU. Overclocking should be done at your own risk and expense. This option appears only when you adopt a non-K-Series CPU.

CPU Configuration

CPU Ratio

Use this to change the ratio value of this motherboard.

Host Clock Override (BCLK)

Use this to adjust the host clock (BCLK) frequency. The default value is [100.0].

Spread Spectrum

This should always be [Auto] for better system stability.

Intel SpeedStep Technology

Intel SpeedStep technology is Intel's power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® and want to enable this function, please set to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

Intel Turbo Boost Technology

Use this to enable or disable Intel Turbo Boost Mode Technology. Turbo Boost Mode allows processor cores to run faster than marked frequency in specific conditions. The default value is [Enabled].

Additional Turbo Voltage

Use this to add voltage when the CPU is in Turbo mode.

Long Duration Power Limit

Use this to configure long duration power limit in watts. The default value is [Auto].

Long Duration Maintained

Use this to configure time window which the long duration power is maintained. The default value is [Auto].

Short Duration Power Limit

Use this to configure short duration power limit in watts. The default value is [Auto].

Primary Plane Current Limit

Use this to configure the maximum instantaneous current allowed for the primary plane. The default value is [Auto].

Secondary Plane Current Limit

Use this to configure the maximum instantaneous current allowed for the secondary plane. The default value is [Auto].

GT OverClocking Support

Use this to enable or disable GT OverClocking Support. The default value is [Disabled].

DRAM Timing Configuration

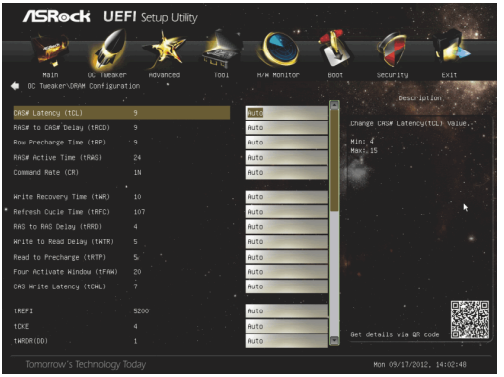
Load XMP Setting

Use this to load XMP settings. Configuration options: [Auto], [Default], [Profile 1] and [Profile 2]. The default value is [Auto].

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

DRAM Configuration



DRAM tCL

Use this to change CAS# Latency (tCL) Auto/Manual settings. The default is [Auto].

DRAM tRCD

Use this to change RAS# to CAS# Delay (tRCD) Auto/Manual settings. The default is [Auto].

DRAM tRP

Use this to change Row Precharge Time (tRP) Auto/Manual settings. The default is [Auto].

DRAM tRAS

Use this to change RAS# Active Time (tRAS) Auto/Manual settings. The default is [Auto].

Command Rate (CR)

Use this to change Command Rate (CR) Auto/Manual settings. The default is [Auto].

DRAM tWR

Use this to change Write Recovery Time (tWR) Auto/Manual settings. The default is [Auto].

DRAM tRFC

Use this to change Refresh Cyle Time (tRFC) Auto/Manual settings. The default is [Auto].

DRAM tRRD

Use this to change RAS to RAS Delay (tRRD) Auto/Manual settings. The default is [Auto].

DRAM tWTR

Use this to change Write to Read Delay (tWTR) Auto/Manual settings. The default is [Auto].

DRAM tRTP

Use this to change Read to Precharge (tRTP) Auto/Manual settings. The default is [Auto].

DRAM tFAW

Use this to change Four Activate Window (tFAW) Auto/Manual settings. The default is [Auto].

DRAM tCWL

Use this to change CAS# Write Latency (tCWL) Auto/Manual settings. The default is [Auto].

tREFI

Use this to change tREFI Auto/Manual settings. The default is [Auto].

tCKE

Use this to change tCKE Auto/Manual settings. The default is [Auto].

tWRDR(DD)

Use this to change DRAM tWRDR Auto/Manual settings. The default is [Auto].

tRWDR(DD)

Use this to change DRAM tRWDR Auto/Manual settings. The default is [Auto].

tRWSR

Use this to change DRAM tRWSR Auto/Manual settings. The default is [Auto].

tRRDD

Use this to change DRAM tRRDD Auto/Manual settings. The default is [Auto].

tRRDR

Use this to change DRAM tRRDR Auto/Manual settings. The default is [Auto].

tRRSR

Use this to change DRAM tRRSR Auto/Manual settings. The default is [Auto].

tWWDD

Use this to change DRAM tWWDD Auto/Manual settings. The default is [Auto].

tWWDR

Use this to change DRAM tWWDR Auto/Manual settings. The default is [Auto].

tWWSR

Use this to change DRAM tWWSR Auto/Manual settings. The default is [Auto].

RTL (CHA)

Use this to change RTL (CHA) Auto/Manual settings. The default is [Auto].

RTL (CHB)

Use this to change RTL (CHB) Auto/Manual settings. The default is [Auto].

IO-L (CHA)

Use this to change IO-L (CHA) Auto/Manual settings. The default is [Auto].

IO-L (CHB)

Use this to change IO-L (CHB) Auto/Manual settings. The default is

[Auto].

ODT WR (CHA)

Use this to change ODT (CHA) Auto/Manual settings. The default is [Auto].

ODT WR (CHB)

Use this to change ODT (CHB) Auto/Manual settings. The default is [Auto].

ODT NOM (CHA)

Use this to change ODT (CHA) Auto/Manual settings. The default is [Auto].

ODT NOM (CHB)

Use this to change ODT (CHB) Auto/Manual settings. The default is [Auto].

DRAM Clock Delay

Use this to configure DRAM Clock Delay. The default is [Auto].

MRC Fast Boot

Use this to enable or disable MRC Fast Boot. The default is [Enabled].

DIMM Exit Mode

Use this to configure DIMM Exit Mode. The default is [Fast Exit].

Power Down Mode

Use this to enable or disable DDR power down mode.

Voltage Configuration

CPU Voltage

Use this to select CPU Voltage. The default value is [Auto].

CPU Load-Line Calibration

CPU Load-Line Calibration helps prevent CPU voltage droop when the system is under heavy load.

IGPU Voltage

Use this to configure IGPU Voltage. The default value is [Auto].

IGPU Load-Line Calibration

IGPU Load-Line Calibration helps prevent IGPU voltage droop when the system is under heavy load.

DRAM Voltage

Use this to configure DRAM Voltage. The default value is [Auto].

VTT Voltage

Use this to configure VTT Voltage. The default value is [Auto].

PCH Voltage

Use this to configure PCH Voltage. The default value is [Auto].

CPU PLL Voltage

Use this to configure CPU PLL Voltage. The default value is [Auto].

VCCSA Voltage

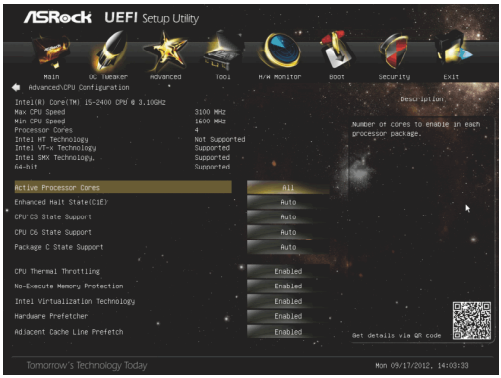
Use this to configure VCCSA Voltage. The default value is [Auto].

3.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Nouth Bridge Configuration, South Bridge Configuration, Storage Configuration, Intel(R) Rapid Start Technology, Intel(R) Smart Connect Technology, Super IO Configuration, ACPI Configuration and USB Configuration.

Setting wrong values in this section may cause the system to malfunction.

3.4.1 CPU Configuration



Intel Hyper Threading Technology

To enable this feature, a computer system with an Intel processor that supports Hyper-Threading technology and an operating system that includes optimization for this technology such as Microsoft® Windows® Vista™ / 7 / 8 is required. Set to [Enabled] if using Microsoft® Windows® Vista™ / 7 / 8 or Linux kernel version 2.4.18 or higher. This option will be hidden if the installed CPU does not support Hyper-Threading technology.

Active Processor Cores

Use this to select the number of cores to enable in each processor package. The default value is [All].

Enhanced Halt State (C1E)

All processors support the Halt State (C1). C1 state is supported through the native processor instructions HLT and MWAIT and requires no hardware support from the chipset. In C1 power state the processor maintains the context of the system caches.

CPU C3 State Support

Use this to enable or disable CPU C3 report to OS.

CPU C6 State Support

Use this to enable or disable CPU C6 report to OS.

Package C State Support

Configure options that will be programmed into C State package limit register. The default value is [Auto].

CPU Thermal Throttling

Use this to enable CPU internal thermal control mechanism to keep the CPU from overheated. The default value is [Enabled].

No-Execute Memory Protection

No-Execution (NX) Memory Protection Technology is an enhancement to the IA-32 Intel Architecture. An IA-32 processor with “No Execute (NX) Memory Protection” can prevent data pages from being used by malicious software to execute codes. This option will be hidden if the current CPU does not support No-Excute Memory Protection.

Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

Hardware Prefetcher

Use this turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

Use this to turn on/off prefetching of adjacent cache lines.

3.4.2 North Bridge Configuration

Primary Graphics Adapter

This allows you to select [Onboard] or [PCI Express] as the primary graphics adapter. The default value is [PCI Express].

VT-d

Use this to enable/disable Intel(R) Virtualization Technology for the Directed I/O.

PCIE1 Link Speed

This allows you to select PCIE1 Link Speed.

PCIE2 Link Speed

This allows you to select PCIE2 Link Speed.

PCIE3 Link Speed

This allows you to select PCIE3 Link Speed.

Share Memory

This allows you to configure share memory. The default value is [Auto].

IGPU Multi-Moniter

This allows you to enable or disable IGPU Multi-Moniter. The default value is [Disabled]. If you wish to install a PCI Express card under Windows® Vista™ OS, please disable this option.

Render Standby

Use this to enable or disable Render Standby by the Internal Graphics Device.The default value is [Enabled].

3.4.3 South Bridge Configuration

Onboard HD Audio

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio. If you select [Auto], the onboard HD Audio will be disabled when a PCI Sound Card is plugged.

Front Panel

Select [Auto] or [Disabled] for the onboard HD Audio Front Panel.

Onboard HDMI HD Audio

This allows you to enable or disable the Onboard HDMI HD Audio.

Onboard 1394

This allows you to enable or disable the Onboard 1394.

Onboard LAN 1

This allows you to enable or disable the Onboard LAN 1.

Onboard LAN 2

This allows you to enable or disable the Onboard LAN 2.

Wireless

This allows you to enable or disable the Wireless function.

Radio Controller

This allows you to enable or disable the Radio Controller.

Deep Sleep

Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only. Configuration options: [Disabled], [Enabled in S5] and [Enabled in S4 and S5].

Restore on AC/Power Loss

This allows you to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers.

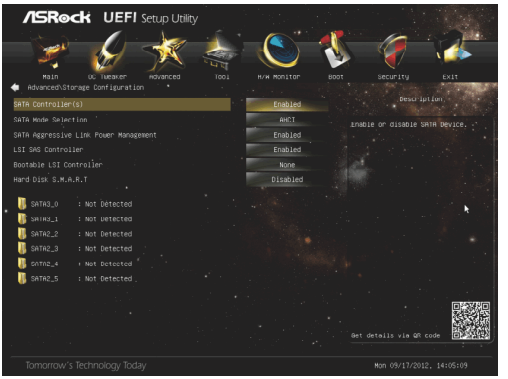
Good Night LED

Use this to enable or disable the Power LED and LAN LED.

Onboard Debug Port LED

Use this to enable or disable the Onboard Debug Port LED.

3.4.4 Storage Configuration



SATA Controller(s)

Use this to enable or disable the SATA Controllers.

SATA Mode Selection

Use this to select the SATA mode for SATA3_0, SATA3_1 and SATA2_2 to SATA2_5 ports. Configuration options: [IDE Mode], [AHCI Mode] and [RAID Mode]. The default value is [AHCI Mode].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

SATA Aggressive Link Power Management

Use this to configure Aggressive Link Power Management.

LSI Controller

Use this to enable or disable the LSI Controller. The default value is [Enabled].

Bootable LSI Controller

Use this to enable or disable the Onboard LSI Option ROM. If Option ROM is disabled, you cannot use the SAS/SATA devices connected to the LSI controller as Boot Device.

Hard Disk S.M.A.R.T.

Use this to enable or disable S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology).

3.4.5 Intel(R) Rapid Start Technology

Intel(R) Rapid Start Technology

Use this to enable or disable Intel(R) Rapid Start Technology. Intel(R) Rapid Start Technology is a new zero power hibernation mode which allows users to resume in just 5-6 seconds. The default is [Enabled].

Entry After

Select a time to enable RTC wake timer at S3 entry. The default is [10 minutes].

Active Page Threshold Support

This allows you to enable or disable Active Page Threshold Support. The default is [Disabled].

3.4.6 Intel(R) Smart Connect Technology

Intel(R) Smart Connect Technology

Use this to enable or disable Intel(R) Smart Connect Technology. Intel(R) Smart Connect Technology keeps your e-mail and social networks, such as Twitter, Facebook, etc. updated automatically while the computer is in sleep mode. The default is [Enabled].

3.4.7 Super IO Configuration

Serial Port

Use this to enable or disable the onboard serial port.

Serial Port Address

Use this to set the address for the onboard serial port. Configuration options: [3F8h / IRQ4] and [3E8h / IRQ4].

Infrared Port

Use this to enable or disable the onboard infrared port.

3.4.8 ACPI Configuration

Suspend to RAM

Use this to select whether to auto-detect or disable Suspend-to-RAM. Select [Auto] to enable if the OS supports it.

Check Ready Bit

Use this to enable or disable Check Ready Bit.

ACPI HPET Table

Use this to enable or disable the ACPI HPET Table. The default value is [Enabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® Vista™ certification.

PS/2 Keyboard Power On

Use this to enable or disable the PS/2 keyboard to turn on the system from power-soft-off mode.

PCI Devices Power On

Use this to enable or disable the PCI devices to turn on the system from power-soft-off mode.

Ring-In Power On

Use this to enable or disable the Ring-In signals to turn on the system from power-soft-off mode.

RTC Alarm Power On

Use this to enable or disable the RTC (Real Time Clock) to power on the system.

USB Keyboard/Remote Power On

Use this to enable or disable the USB Keyboard/Remote to power

on the system.

USB Mouse Power On

Use this to enable or disable the USB Mouse to power on the system.

CSM

Please disable CSM when Fast Boot is enabled. The default value is [Enabled].

3.4.9 USB Configuration

USB 2.0 Controller

Use this to enable or disable the USB 2.0 controller.

USB 3.0 Controller

Use this to enable or disable the USB 3.0 controller.

Legacy USB Support

Use this to select legacy support for USB devices. There are four configuration options: [Enabled], [Auto], [Disabled] and [UEFI Setup Only]. The default value is [Enabled]. Please refer to the descriptions below for details of these four options:

[Enabled] - Enables support for legacy USB.

[Auto] - Enables legacy support if USB devices are connected.

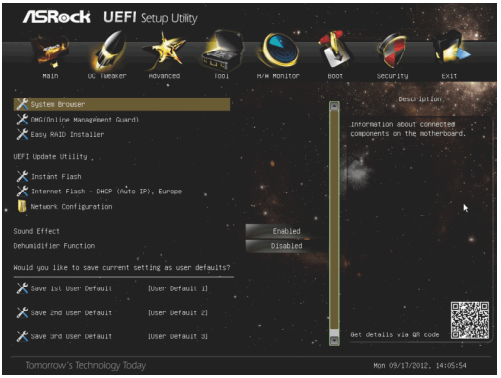
[Disabled] - USB devices are not allowed to be used under legacy OS and UEFI setup when [Disabled] is selected. If you have USB compatibility issues, it is recommended to select [Disabled] to enter the OS.

[UEFI Setup Only] - USB devices are allowed to be used only under UEFI setup and Windows / Linux OS.

Legacy USB 3.0 Support

Use this to enable or disable legacy support for USB 3.0 devices. The default value is [Enabled].

3.5 Tool



System Browser

System Browser can let you easily check your current system configuration in UEFI setup.

OMG (Online Management Guard)

Administrators are able to establish an internet curfew or restrict internet access at specified times via OMG. You may schedule the starting and ending hours of internet access granted to other users. In order to prevent users from bypassing OMG, guest accounts without permission to modify the system time are required.

Easy RAID Installer

Easy RAID Installer can help you copy the RAID driver from the support CD to your USB storage device. After copying the RAID driver to your USB storage device, please change “SATA Mode Selection” to “RAID”, then you can start installing the OS in RAID mode.

Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update the system UEFI without entering operating systems like MS-DOS or Windows® first. Just save the new UEFI file to your USB flash drive, floppy disk or hard drive and launch this tool, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash

drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after the UEFI update process is completed.

Internet Flash

ASRock Internet Flash searches and updates the latest UEFI firmware version from our servers for you. In other words, you won't need to enter Windows® OS to waste time on searching for the files or copying the files to an USB device. It will all be done automatically by one click in the UEFI.

Network Configuration

Use this to configure internet connection settings for Internet Flash.

Sound Effect

Enable or disable sound effects in the setup utility.

Dehumidifier Function

Users may prevent motherboard damages due to dampness by enabling "Dehumidifier Function". When enabling Dehumidifier Function, the computer will power on automatically to dehumidify the system after entering S4/S5 state.

Dehumidifier Period

This allows users to configure the period of time until the computer powers on and enables "Dehumidifier" after entering S4/S5 state.

Dehumidifier Duration

This allows users to configure the duration of the dehumidifying process before it returns to S4/S5 state.

Dehumidifier CPU Fan Setting

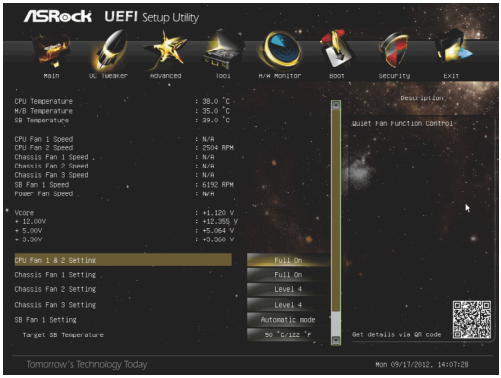
Use this setting to configure CPU fan speed while "Dehumidifier" is enabled.

User Defaults

You are allowed to load and save three user defaults according to your own requirements.

3.6 Hardware Health Event Monitoring Screen

This section allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, fan speed and voltage.



CPU Fan 1 & 2 Setting

This allows you to set CPU fan 1 & 2's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

Chassis Fan 1 Setting

This allows you to set chassis fan 1's speed. Configuration options: [Full On], [Automatic Mode] and [Manual]. The default value is [Full On].

Chassis Fan 2 Setting

This allows you to set chassis fan 2's speed. The default value is [Level 4].

Chassis Fan 3 Setting

This allows you to set chassis fan 3's speed. The default value is [Level 4].

SB Fan 1 Setting

This allows you to set SB fan 1's speed. Configuration options: [Full On] and [Automatic mode]. The default value is [Automatic mode].

Target SB Temperature

This allows you to set the target temperature to activate ASRock X-FAN. The default value is [50°C/122°F].

Target Fan Speed

This allows you to set target fan's speed. The default value is [Level

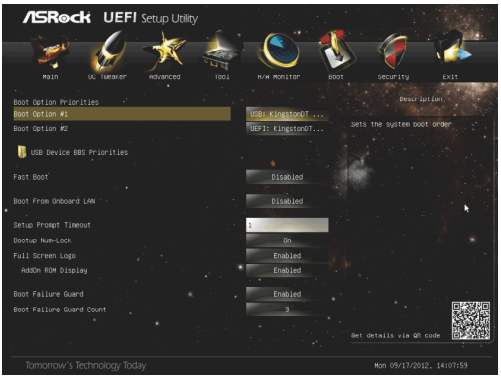
9].

Over Temperature Protection

Use this to enable or disable Over Temperature Protection. The default value is [Enabled].

3.7 Boot Screen

This section displays the available devices on your system for you to configure the boot settings and the boot priority.



Fast Boot

Fast Boot minimizes your computer's boot time. Configuration options:

[Disabled] - Disable Fast Boot.

[Fast]: When selecting "Fast", it is not allowed to boot from a USB storage device.

[Ultra Fast]: There are a few restrictions

1. Only supports Windows 8 UEFI operating system

2. You will not be able to enter BIOS Setup by using the keyboard. The only way to enter UEFI Setup is to clear CMOS or run the "Restart to UEFI" utility in windows.

3. If you are using an external graphics card, the VBIOS must support UEFI GOP in order to boot.

Boot From Onboard LAN

Use this to enable or disable Boot From Onboard LAN.

Setup Prompt Timeout

This shows the number of seconds to wait for the setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup Num-Lock

If this is set to [On], it will automatically activate the Numeric Lock

after boot-up.

Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Enabled].

AddOn ROM Display

Use this option to adjust AddOn ROM Display. If you enable the option “Full Screen Logo” but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

Boot Failure Guard

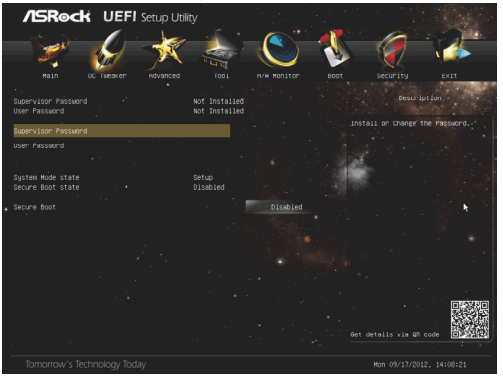
Enable or disable Boot Failure Guard.

Boot Failure Guard Count

Enable or disable Boot Failure Guard Count.

3.8 Security Screen

In this section you may set or change the supervisor/user password for the system. You may also clear the user password.



Secure Boot

Use this to enable or disable Secure Boot Control. The default value is [Disabled].

3.9 Exit Screen

Save Changes and Exit

When you select this option the following message, “Save configuration changes and exit setup?” will pop out. Select [OK] to save changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option the following message, “Discard changes and exit setup?” will pop out. Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option the following message, “Discard changes?” will pop out. Select [OK] to discard all changes.

Load UEFI Defaults

Load UEFI default values for all options. The F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Attempt to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.